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Final Report

Multiple Stage High Resolution Mass Spectrometry Instrumentation

AFOSR 83-0314

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7 November 1984

After careful review and testing of several commercially available high resolution, tandem mass spectrometers, the University of Colorado has purchased a model 7070EQ-HF from VG Analytical, Inc. Total cost of the instrument was $415,000 of which $200,00 was provided by grant number AFOSR 83-0314 from the Department of Defense - University Research Instrumentation Program. The instrument has now been delivered and is being installed in space that was specifically renovated by the University as a new mass spectrometry laboratory.

The instrument consists of a high resolution first stage with a forward geometry (electrostatic sector followed by magnetic sector) and a quadrupole second stage which is preceded by a reaction cell. Sample inlets include several probes and a gas chromatograph. Ionization options include electron impact (EI), chemical ionization (CI), alternating CI/EI, and fast atom bombardment. A sophisticated data system is used for mass spectrometer operation, data acquisition, and data interpretation.

When installation is complete, the new mass spectrometer will be used to enhance research for a variety of DOD and non-DOD sponsored programs. Tandem mass spectrometry methods will be developed to detect trace levels of organic compounds in complex mixtures and to augment studies of specific sorbent materials. The collisional dissociation chemistry of metal chelates and other compounds will be stu-

died. Less volatile and labile molecules will be studied using fast atom bombardment techniques. High resolution mass spectrometry will be used to characterize ionization pathways and to determine exact masses of a variety of compounds.

Overall, we are excited by the emerging capabilities of this new instrument and anticipate that it alone will generate rapid advances in many research programs.